c. pouring a molten casing alloy into the heated mold;

d. lowering the mold with the molten alloy into a cooling zone comprising a tank having an open upper portion and a closed bottom portion with water-cooled walls extending therebetween, the open upper portion being immediately adjacent to the heating zone; and

e. solidifying the molten alloy by radiation cooling onto the water-cooled wall of the tank to form the metal casting.

Please add new claims 15 to 25 as follows:

15. The method of claim 9 wherein the tank has a truncated cross-sectional with the bottom portion having a smaller base than the upper portion.

16. The method of claim 9 wherein the mold has a starter cavity for a crystal having a defined crystal orientation.

17. The method of claim 9 wherein the tank has a double layer wall.

18. The method of claim 9 wherein the tank is made of stainless steel.

19. The method of claim 9 wherein the mold is made of a ceramic.

20. The method of claim 9 wherein the mold and the furnace are disposed in a vacuum chamber.

21. The method of claim 9 wherein the furnace comprises a preheating furnace and an induction furnace.

22 A method of making a metal casting comprising the steps of:

a placing a casting alloy into a furnace having a preheater in a vacuum chamber.

b lowering the alloy into the preheating furnace;

c. evacuating the vacuum chamber;

d. heating the alloy to a temperature of about 100 to 150 ^{0}C above a liquidus temperature of the alloy to provide a molten alloy;

e. providing a heating furnace to heat the mold; the heating furnace having a heating zone;

f. pouring molten alloy into the heated mold;

g disposing a baffle under the heating zone;

h. lowering the mold with the molten alloy into a cooling zone comprising a tank having an open upper portion and a closed bottom portion with water-cooled walls extending therebetween, the open upper portion being immediately adjacent to the heating zone;

i. turning off the preheater and the furnace heater;

j. solidifying the molten alloy by radiation cooling onto the water-cooled wall of the tank until the temperature is decreased to 300-400^{0} C;

k. decompressing the vacuum chamber; and

l. extracting the solidified metal casting.

23. The method of claim 22 wherein the mold has a starter cavity for a crystal having a defined crystal orientation.

24. The method of claim 22 wherein the tank has a truncated cross-sectional with the bottom portion having a smaller base than the upper portion.

25. The method of claim 22 wherein the mold has a starter cavity for a crystal having a defined crystal orientation.